

## SPECIAL FORECASTS AND WARNINGS—WEATHER AND CROPS.

## WEATHER WARNINGS.

By EDWARD H. BOWIE, Supervising Forecaster.

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## FORECASTS FOR THE U. S. NAVY IN CONNECTION WITH THE FIRST TRANSATLANTIC SEAPLANE FLIGHT.

Under an agreement between the United States Weather Bureau and the United States Navy Department, the Weather Bureau undertook the forecasting of the meteorological conditions along the route to be followed by the seaplanes from the time they left the Rockaway flying field, Long Island, N. Y., until they reached the Azores. The forecasts were issued thrice daily based on observations taken at 8 a. m., 1 p. m., and 8 p. m., seventy-fifth meridian time, and were given to the Navy Department in Washington, for transmission to their destinations. Moreover, synoptic reports from a considerable number of Weather Bureau and Canadian stations at these hours were also furnished the Navy Department for transmission to Rockaway, Halifax, and Trepassey Bay, when the seaplanes were at these points. The United States Navy furnished meteorological observations from a number of points in western Europe and from naval vessels along the course from Newfoundland to the Azores.

The start of the seaplanes NC-1, NC-3, and NC-4 was made from Rockaway the morning of the 8th, two of them, the NC-1, and NC-3 reaching their destination, Halifax, the afternoon of the same day. The NC-4 developed engine trouble and put into Chatham, Mass. The forecast issued the morning of the 8th was as follows:

Moderate northwest and west winds. Fair weather to-day. Friday fresh north to east winds, cloudy weather with rain over southern half of course.

The evening of the 9th the following forecast was made for the seaplanes for the course between Halifax and Trepassey Bay:

Weather favorable for flight Saturday. Gentle variable winds. Fair weather. Wind velocity less than fifteen miles an hour.

The morning of the 10th, the forecast for the same course read:

Fair weather Halifax to Newfoundland. Gentle variable winds, except moderate west and northwest off south coast of Newfoundland.

The flight from Halifax to Trepassey Bay was made on the 10th and the two seaplanes, the NC-1 and NC-3, reached their destination, Trepassey Bay, the afternoon of the same day.

In the meantime, the seaplane, NC-4, at Chatham, Mass., had made ready for a renewal of the flight to Halifax, but it was held there for several days because of adverse wind and weather conditions. On the evening of the 13th the following forecast was sent the commander of seaplane NC-4 at Chatham, Mass.

Conditions favorable for start from Chatham for Halifax Wednesday morning (the 14th). Moderate to fresh westerly winds and fair weather.

On the morning of the 14th the following forecast was sent to the same address:

Moderate westerly winds, fair weather Chatham to Halifax. Conditions extremely favorable for start this morning.

The flight was made to Halifax on this day under favorable conditions. On the evening of the 14th the

following forecast was issued for the course Halifax to Newfoundland for the NC-4 at Halifax:

Gentle and moderate variable winds mostly north and partly cloudy weather Halifax to Newfoundland. Some doubt as to fog off south coast of Newfoundland. Advices concerning this should be had before starting from Halifax Thursday morning.

The NC-4 left Halifax on the 15th and arrived at Trepassey Bay the same afternoon.

From the time of the arrival of the NC-1 and NC-3 at Trepassey Bay on the 10th until the 16th the weather and wind conditions over the course between Newfoundland and the Azores were unfavorable and were forecast accordingly. On the 15th the following forecast was sent the commander of the seaplane squadron at Trepassey Bay:

Wind and weather conditions over the course (Newfoundland to the Azores) will improve during Friday and Saturday. Wind will be west and fresh and possibly strong. Weather will be fair. Above based on incomplete reports from the ocean. Advise start by Friday night. Later information will be sent you Friday.

On Friday the following forecast was sent the commander of the seaplanes at Trepassey Bay:

Surface winds fresh and possibly strong west-southwest and upper winds fresh to strong west over course between Newfoundland and the Azores, some clouds, fair visibility, and rising pressure. Conditions favorable for start.

The seaplanes left Trepassey Bay the afternoon of the 16th for the Azores. The NC-4 reached the Azores the late forenoon of the 17th. The NC-1 and NC-3 landed in the vicinity of the Azores the morning of the 17th, but were unable to rise from the water and resume their flight. The landings were necessary according to press reports—because of low clouds and mist.

At the time the seaplanes were preparing for the transatlantic flight, the United States Navy dirigible C-5 was ready to make a flight from Cape May to St. Johns, Newfoundland, with the tentative purpose of extending the flight across the ocean in the event that a satisfactory trip was made to Newfoundland. This airship left Cape May, it is understood, on the 8th of May, encountered unfavorable weather and put in at Montauk Point, Long Island, N. Y., whence it started for St. Johns, Newfoundland, on the 14th. On the 13th the following information was sent the United States naval air station, Montauk Point, N. Y.:

Conditions favorable for start from Montauk Point Wednesday morning. Moderate to fresh westerly winds and fair weather.

The C-5 reached its destination, St. Johns, Newfoundland, on the morning of the 15th. In the afternoon of that day during a squall it broke its moorings and drifted eastward over the Atlantic Ocean and was lost.\*

## WASHINGTON FORECAST DISTRICT.

Storm warnings on the Great Lakes: Southwest-storm warnings were displayed at 10 a. m. of the 1st on Lakes Erie and Ontario, in connection with a low-pressure area which was central at 8 a. m. of the 1st over northern Indiana. This disturbance moved rapidly northeastward and strong southwest winds and gales occurred as

\* See "Official story of C-5 dirigible's record flight to Newfoundland," Aerial Age Weekly, June 16, 1919, pp. 683, 702.—Ed.

forecast. Moreover, strong westerly winds also occurred on the Upper Lakes. The highest wind velocity in connection with this storm, 60 miles an hour from the southwest, occurred at Buffalo on the 2d.

On the 3d at 10 a. m. southeast-storm warnings were displayed on Lake Michigan and northeast warnings on Lake Superior, except at Sault Ste. Marie. At 4 p. m. of the same day southeast warnings were displayed on Lake Huron. These warnings were ordered at the time that a disturbance of moderate intensity was central over Nebraska. This disturbance moved northward and although squally weather and fresh and strong winds occurred at some points, no general storm winds occurred in connection with it.

On the 17th at 9:30 a. m. northwest-storm warnings were ordered for Lake Ontario and Lake Erie at and east of Cleveland in connection with a low-pressure area that was central at 8 a. m. over Georgian Bay. Strong westerly winds occurred between 8 a. m. and 8 p. m. of the 17th and the signals were lowered at 9:30 p. m. of the same day.

On the 20th at 9:30 a. m. northwest-storm warnings were displayed on Lake Huron between Saginaw and Port Huron and on Lake Erie, Detroit to Cleveland, and at the same time southeast warnings were ordered on eastern Lake Erie and Lake Ontario. At 8 a. m. of this date a storm of considerable intensity was central over Ohio. Strong winds, rain and thick weather occurred during the 20th, but the disturbance under consideration rapidly lost intensity, and during the night of the 20th the winds moderated on the Great Lakes.

*Storm warnings on the Atlantic coast.*—On the 1st when a disturbance of marked intensity was central over northern Indiana, southwest-storm warnings were displayed at 10 a. m. at and between Cape Henry, Va., and Boston, Mass. This disturbance moved northeastward during the succeeding 36 hours, and strong south and southwest winds with rain and fog prevailed over that section of the Atlantic coast where warnings were displayed.

On the 9th at 10 p. m. northeast-storm warnings were displayed on the Atlantic coast at and between Delaware Breakwater, Del., and Provincetown, Mass. At 8 p. m. of this date a disturbance was central over eastern Tennessee and an extensive high-pressure area covered the region of the Great Lakes, the St. Lawrence Valley, and New England. Strong easterly winds and gales and rain set in the night of the 9th over the section of the coast where warnings were displayed, and these conditions persisted through the 10th and 11th and extended northward to Eastport, Me., on the 12th. In the meantime the section of the coast covered by northeast warnings was extended northward to Portland, Me., at 10 a. m. of the 10th and to Eastport, Me., at 10 a. m. of the 12th. This disturbance passed northeastward, and the morning of the 14th its center was over the Gulf of St. Lawrence.

On the 17th at 9:30 a. m., southwest warnings were displayed along the coast from Sandy Hook, N. J., to Eastport, Me. At 8 a. m. of this date a low-pressure area of considerable intensity was over the Great Lakes and moving east-northeastward. Strong southerly winds, rain, and thick weather prevailed during the afternoon and night of the 17th off the middle Atlantic and New England coasts, the highest wind velocity reported being 48 miles an hour from the south at New York City.

On the 20th at 6 p. m., southwest-storm warnings were displayed on the Atlantic coast between Norfolk, Va., and Boston, Mass. At 1 p. m. of this date a low-pressure area of considerable intensity was over Indiana

and moving eastward. This disturbance, however, decreased in intensity as it moved eastward, and at 9:30 a. m. of the 21st the warnings on the coast were lowered.

No storm warnings were displayed during the month south of Cape Henry, neither were warnings other than small-craft warnings displayed on the Gulf coast east of New Orleans.

In connection with the work of the Weather Bureau on the Great Lakes a communication recently received from Capt. John Hyatt, of the *City of Alpena*, one of the boats of the Detroit & Cleveland Navigation Co., is given below:

"I want to thank you and the radio station at Alpena for the very fine service rendered me in the past five seasons. The weather reports and currents furnished me have never failed, which means everything to the safety of ships in bad weather."

*Frost warnings.*—In the Washington forecast district frost warnings were issued on the 5th for Indiana and Michigan; on the 6th for northern New England and the northern and central parts of eastern New York; on the 7th and 8th for Michigan and northern Indiana; on the 10th and 11th for Michigan; on the 12th for West Virginia, lower Michigan and the eastern part of upper Michigan; on the 12th and 13th for the cranberry bogs of New Jersey; on the 13th for New England, New York, and Pennsylvania; on the 17th for Michigan; on the 18th for parts of New York and New England; and on the 20th for Michigan.

#### WARNINGS FROM OTHER DISTRICTS.

*Chicago, Ill., forecast district.*—No frost warnings were issued or required for Illinois, Minnesota, Iowa, Missouri, or Kansas, but warnings were issued on the 6th, 30th, and 31st for portions of the northern Rocky Mountain region or northern Plains States, and on the 5th, 7th, 15th, 16th, 17th, 19th, 20th, and 21st for portions of Wisconsin. No warnings were issued for the cranberry bogs until the 15th, on account of the backwardness of the season, and those issued thereafter were not well verified because of cloudiness.

Special fire-weather forecasts were sent to the forest rangers at a number of points in northern Minnesota, beginning on the 29th, the situation in that section having become serious on account of protracted hot, dry weather.—*Chas. L. Mitchell.*

*New Orleans, La., forecast district.*—With rather high air pressure prevailing during much of the month in the north-eastern portion of the country and low pressure over the southwestern States, conditions in this forecast district were favorable for considerable cloudiness and comparatively cool weather, and it is worthy of note that the highest temperatures were below 90° at all regular stations in the central and eastern portions of the district.

The winds of gale force mostly attended thunderstorms. No general storm occurred without warning.

Small-craft warnings were displayed on the Texas coast on the 6th and were justified.

Southeast-storm warnings were ordered on the morning of the 24th from Morgan City, La., to Corpus Christi, Tex., because of a disturbance over southern Texas, moving northeast. Warnings stated that the disturbance would cause "strong southerly winds to moderate gales, with thundersqualls to-day, shifting to northwest on Texas coast to-night." The warnings were extended along the remainder of the Louisiana coast after midday special observations were obtained. Conditions occurred generally as forecast and squalls were severe in localities near the lower Sabine River.

No frosts were reported and there was but one frost warning. On the 4th a forecast of probably frost was issued for the Texas Panhandle and western Oklahoma. In this instance the area of high pressure moved eastward instead of southeastward and the pressure was low over the Plateau States on the 5th, preventing any decided temperature fall in this district.—*R. A. Dyke.*

*Denver, Colo., Forecast District.*—Pressure conditions were not favorable to the usual distribution of precipitation, the month being droughty on the middle eastern slope, while on the southeastern slope more precipitation than usual occurred. Temperature conditions prior to the closing days were unusually favorable, the cold snaps and sudden changes so common in the northern half of the district were notably absent and the subject of general comment. It is true frost warnings were issued on a few dates in the first half of the month for localities, but the damage, if any, was slight.

Decided changes in pressure distribution during the closing days brought a cold spell of unusual intensity for so late in the season. On the morning of the 30th the pressure was low from Arizona northeastward to the Dakotas while high pressure overlay the Pacific Northwest. Warnings of frost were issued for western Colorado and Utah, in expectancy of the development of a low center on the southeastern Rocky Mountain slope coincident with the southeastward movement of the front of the anticyclone. Although this distribution of pressure occurred the warning was fully justified only in the greater part of Utah; in Colorado sharp falls in temperature occurred, but it is doubtful whether frosts occurred in the valleys of western Colorado.

On the morning of the 31st warnings of frost or freezing temperatures were issued for western and northern Colorado, northern New Mexico, northeastern Arizona, and Utah. In addition to the warnings the distribution observer in the Gunnison district of Colorado was directed to advise orchardists. Frosts or freezing temperatures were confined to the areas to which warnings were sent; there was considerable variation in the intensity of the cold; in localities the freeze was destructive to important crops, while in others the damage was confined to garden truck and other tender vegetation.—*Fredk. H. Brandenburg.*

*San Francisco, Calif., Forecast District.*—This district was comparatively free from storm activity during the month of May, 1919. The low areas during the month entered the continent at a high latitude and except in western Washington there were but few rainy days. The feature of the month was the frequency with which troughs of low pressure formed over the Plateau region either from the passage of low areas through Alberta and Saskatchewan or from small secondary depressions developing over the valley of the Colorado in consequence of, and just subsequent to, the passage of a low in the north. The eastward movement of these troughs were followed by sharp falls in temperature and frequent frosts in the Plateau region. During the prevalence of one of these depressions over Nevada and Idaho on the 27th and 28th, very high temperatures occurred in those States, and the record for high May temperatures was broken at Pocatello on the 28th, when the maximum reached 94 degrees.

Live-stock warnings were issued on the 1st in eastern Oregon and Idaho, reading "Cold rains and gusty westerly winds to-night, Friday, and possibly Saturday." The rains did not occur, but strong winds and colder weather prevailed for the following two days.

Small-craft warnings were ordered on the Oregon and Washington coasts on the 13th; southwest-storm warnings were ordered from the Columbia River north on the 25th and 26th; and northwest-storm warnings were ordered at Point Reyes on the 29th.

Frost warnings were issued in eastern Oregon, eastern Washington, and Idaho on May 2, 3, 4, 5, 6, 12, and 17; in Washington, Oregon, and Idaho on May 10 and 30; and in Nevada on May 5, 6, 10, 12, and 30.

Fire-weather warnings were issued in California on the 31st, to the district forester for distribution, reading: "Moderate to strong drying northerly winds with high day temperatures next two or three days. Danger of forest fires in all California forests except probably Modoc and Mono. Supervisors should be warned." This warning was followed by a decided rise in temperature and strong northerly winds north of the Tehachapi. The wind did considerable damage to fruit and grain in some portions of the Sacramento Valley.—*G. H. Willson.*